



POTSDAM INSTITUTE FOR
CLIMATE IMPACT RESEARCH

Delayed Action, the Paris agreement and the 2°C limit

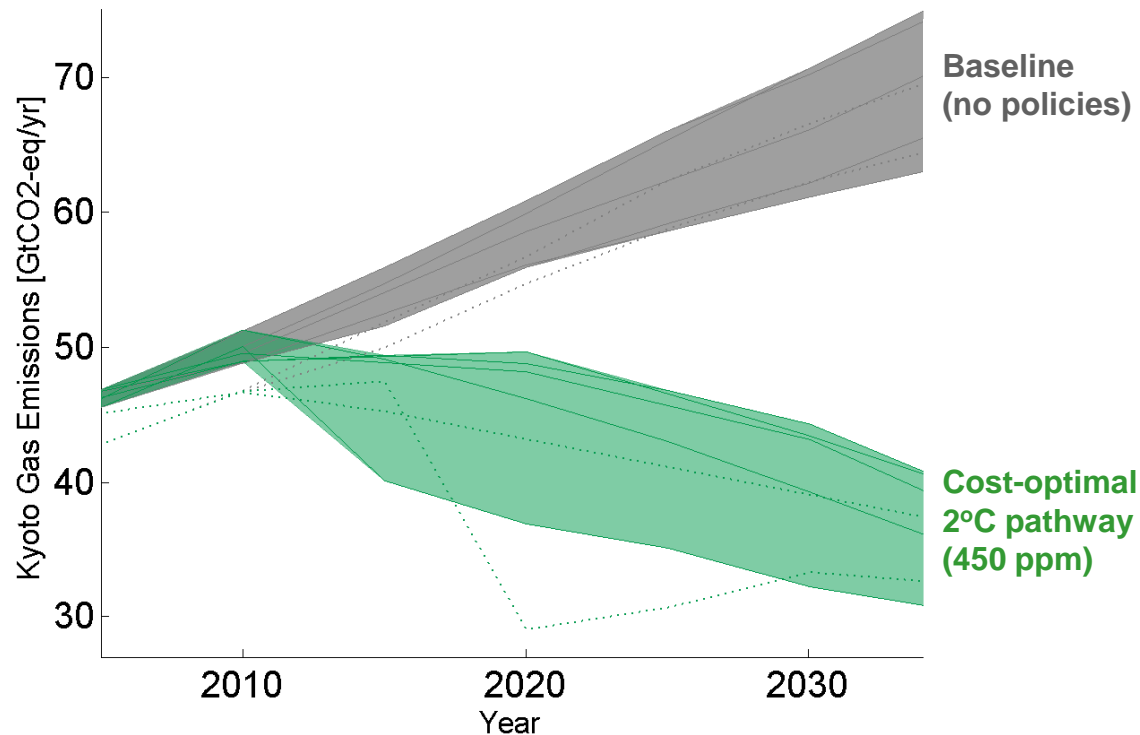
Gunnar Luderer

with contributions from

Christoph Bertram, Elmar Kriegler and others

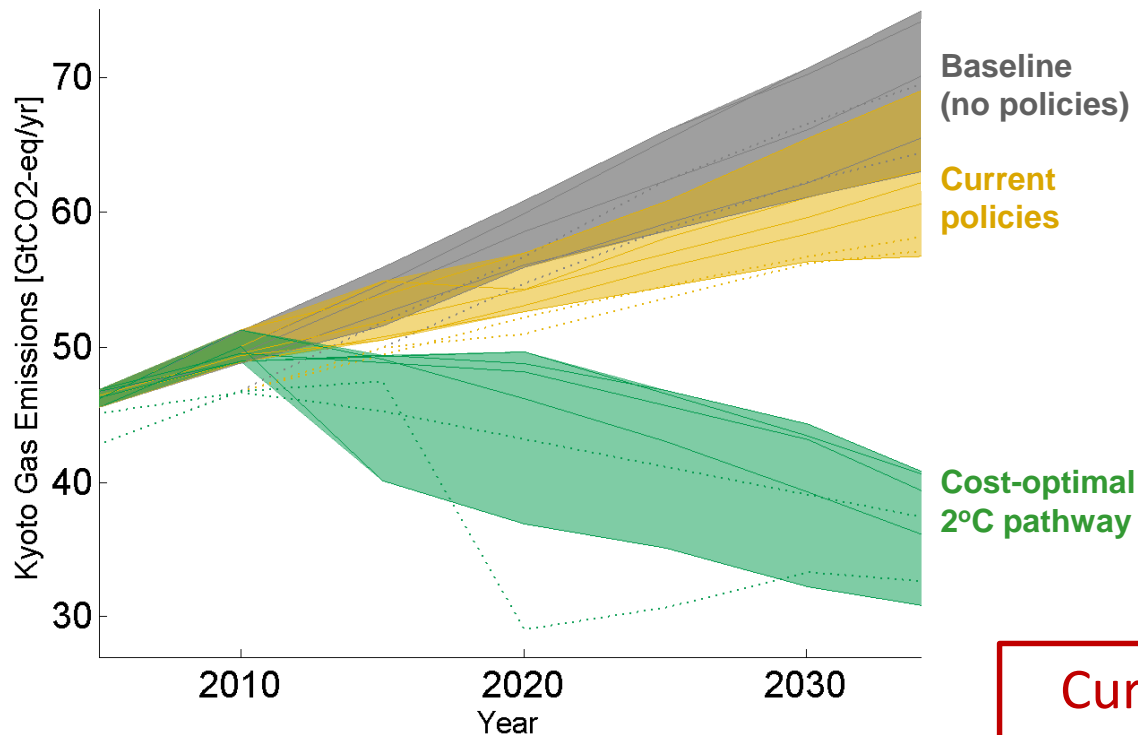
Strommarkttreffen, January 8th, 2016

Not on track: Current trends and the 2°C limit



Based on LIMITS study,
Kriegler et al. (2014)

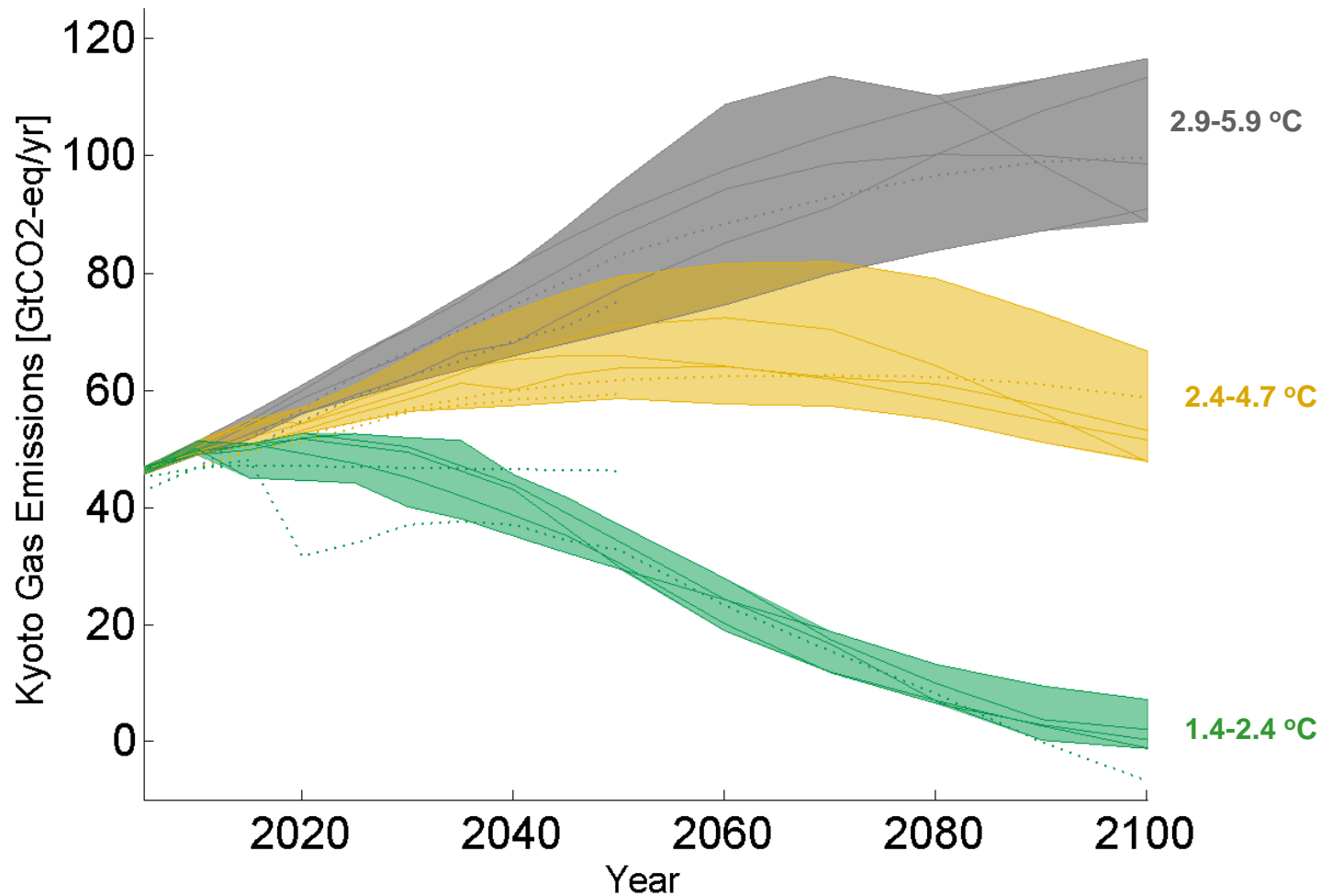
Not on track: Current trends and the 2°C limit



Based on LIMITS study,
Kriegler et al. (2014)

Current policy trends are not in line with pathways distributing mitigation effort for 2°C optimally over time

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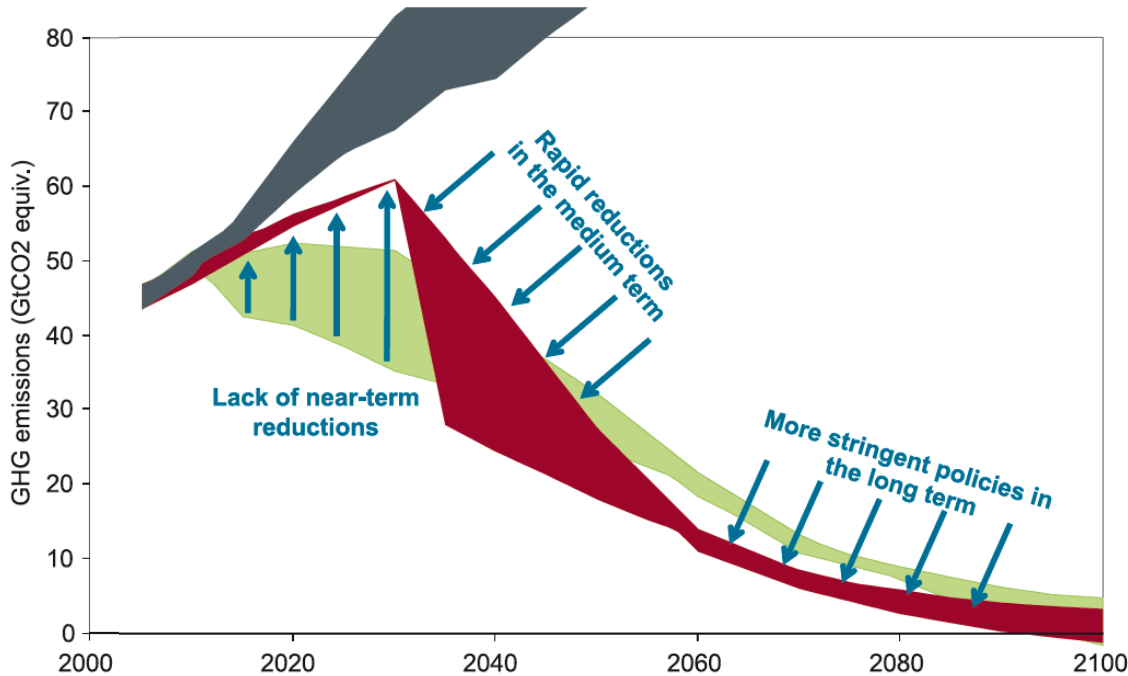
What are the implications of delayed action for staying below 2°C?

The weaker near-term policy actions are, the greater mitigation challenges get in the medium to long-term.

Important areas of concern include:

- **Carbon lock-ins** impeding future mitigation efforts
- Greatly increased **pace of decarbonization** required in the medium-term
- Strong impacts on **mitigation costs** and **economic growth**
- Reduced societal choices and greater reliance on **negative emissions technologies**
- **Reduced co-benefits** of climate action

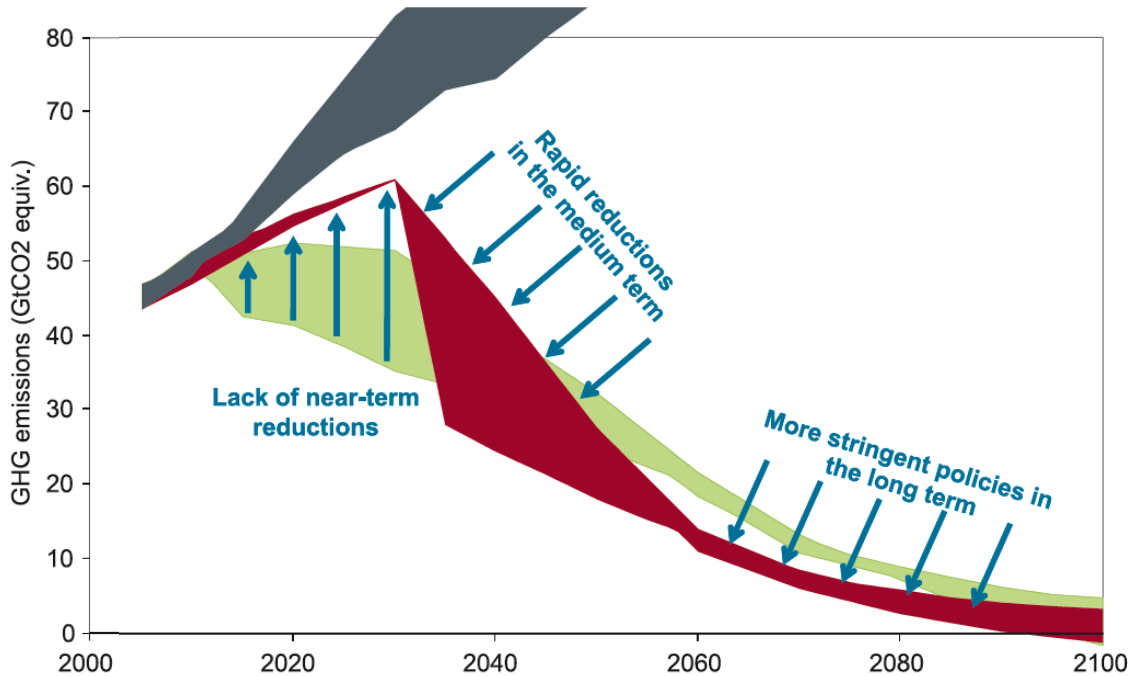
Challenges of delayed policy scenarios



Riahi et al. (2015): Locked into Copenhagen pledges — Implications of short-term emission targets for the cost and feasibility of long-term climate goals, *Tech Forecast Soc Change* 90A.

- Short-term excess emissions, compensated by **lower long-term emissions**
- **Rapid medium term emission reduction** requirements
- **Negative emissions** become even more crucial
- **Reduced co-benefits** of climate policy
- **Inertia** in energy system: **carbon lock-in** and insufficient ramp-up of alternatives
- Overall **higher economic mitigation challenges**

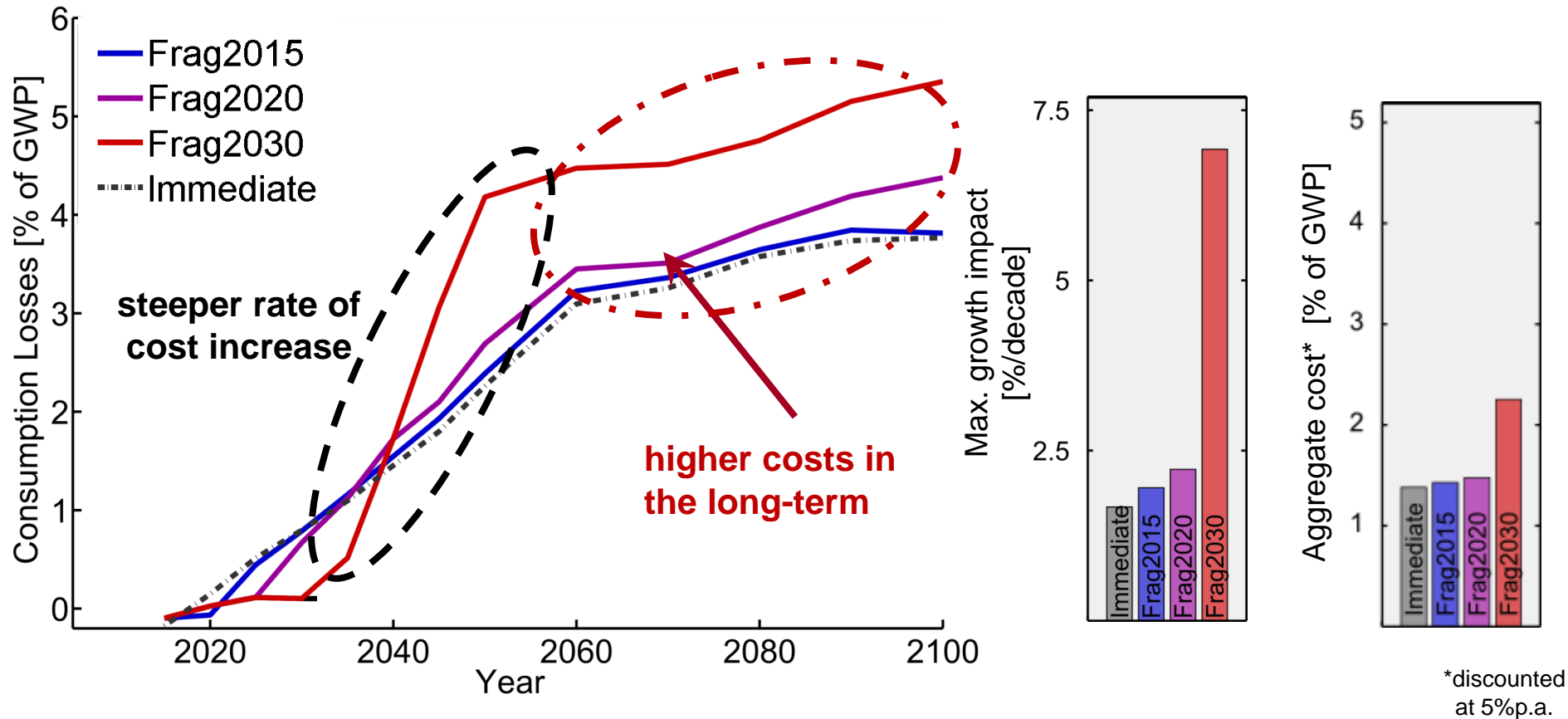
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Increased mitigation costs



Luderer et al. (2013)

The Paris climate deal

- **Unanimous commitment** to ambitious climate change mitigation
- Strengthening of the long-term climate goal: **Hold T-increase well below 2°C and pursue efforts to limit warming to 1.5°C.**
- Emissions reduction efforts framed as **(intended) nationally determined contribution (INDCs)**. Currently, INDCs have been submitted by nations covering 96% of global emissions
- The Paris decision notes that **aggregate global effort falls way short of requirement for limiting warming to 2°C** cost optimally (based on scientific scenario literature)
- **Five-year review and update cycles** to **strengthen NDCs**, reflecting gap to 2°C pathways.

Policy relevant insights

- Current national emission reduction contributions are still inconsistent with requirements for 2°C-limit
- If no further reductions are achieved by 2030, post-2030 mitigation challenges set to become prohibitive
- Paris agreement can become an entry point for progressive strengthening (“ratcheting-up”) of mitigation action to facilitate the transition to a 2°C-consistent pathway
- Success of post-Paris climate policies hinges critically on avoiding carbon lock-ins, as the further build-up of fossil infrastructure will drastically decrease future mitigation potential.

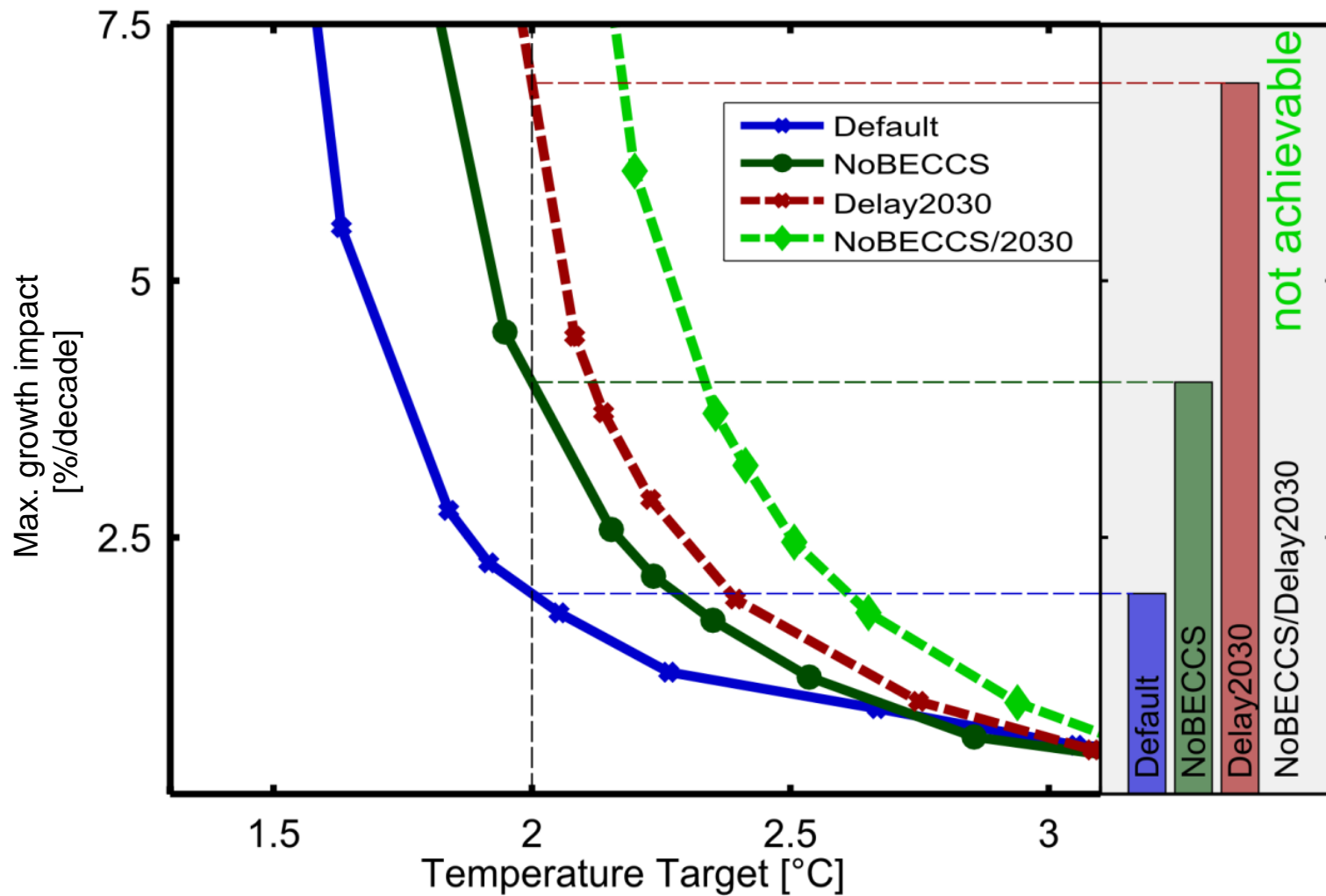
References

- Bertram C, Johnson N, Luderer G, et al (2015) Carbon lock-in through capital stock inertia associated with weak near-term climate policies. *Technological Forecasting and Social Change* 90, Part A:62–72. doi: 10.1016/j.techfore.2013.10.001
- Bertram C, Kriegler E, Luderer G, et al. (in review) A bridge from Paris to below 2°C trajectories through progressive policy commitments
- Kriegler E, Riahi K, Bauer N, et al (2015) Making or breaking climate targets: The AMPERE study on staged accession scenarios for climate policy. *Technological Forecasting and Social Change*. doi: 10.1016/j.techfore.2013.09.021
- Kriegler E, Tavoni M, Aboumahboub T, et al (2014) What does the 2°C target imply for a global climate agreement in 2020? the limits study on durban platform scenarios. *Clim Change Econ* 04:1340008. doi: 10.1142/S2010007813400083
- Luderer G, Pietzcker RC, Bertram C, et al (2013) Economic mitigation challenges: how further delay closes the door for achieving climate targets. *Environ Res Lett* 8:034033. doi: 10.1088/1748-9326/8/3/034033
- Luderer, G, Bertram C, Calvin K, De Cian E, and Kriegler E. “Implications of Weak near-Term Climate Policies on Long-Term Mitigation Pathways.” *Climatic Change*, 2013, 1–14. doi:10.1007/s10584-013-0899-9.
- Riahi K, Kriegler E, Johnson N, et al (2015) Locked into Copenhagen pledges — Implications of short-term emission targets for the cost and feasibility of long-term climate goals. *Technological Forecasting and Social Change*. doi: 10.1016/j.techfore.2013.09.016
- Schaeffer, M, Gohar L, Kriegler E et al (2015). Mid- and Long-Term Climate Projections for Fragmented and Delayed-Action Scenarios. *Technological Forecasting and Social Change* : 257–68. doi:10.1016/j.techfore.2013.09.013.

Backup

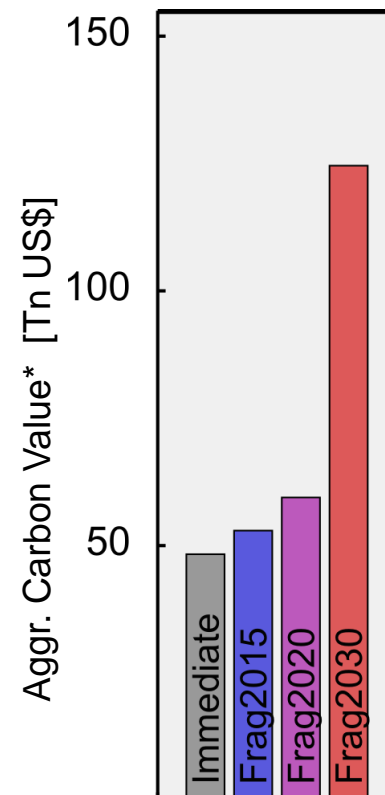
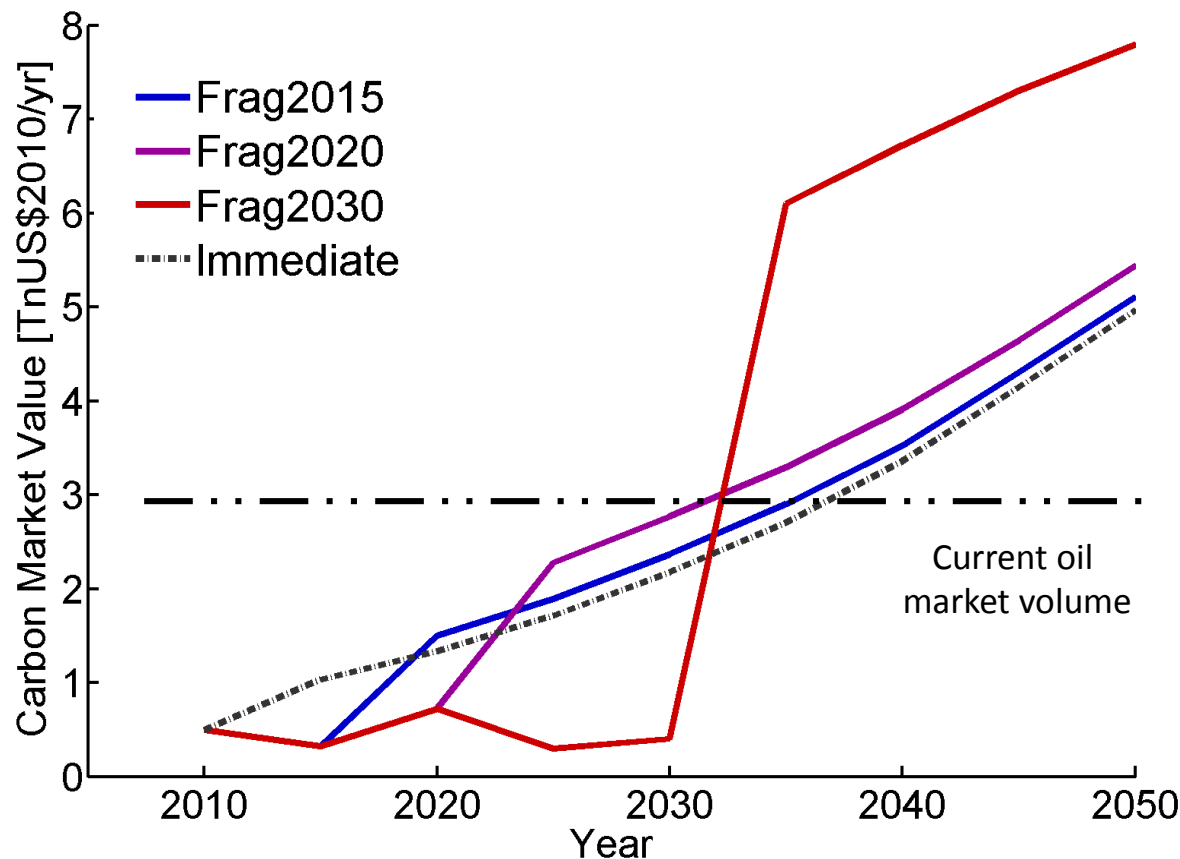


Increased reliance on biomass with CCS



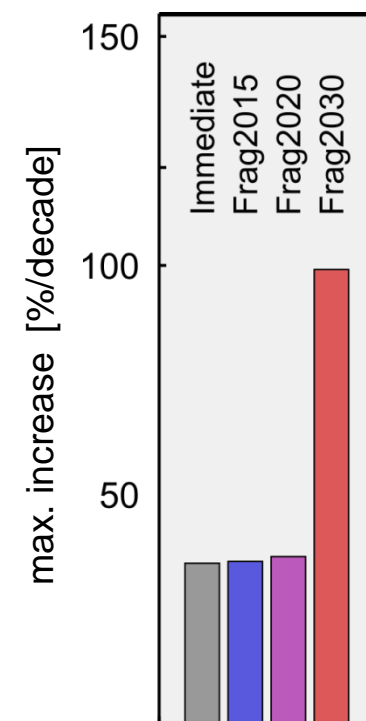
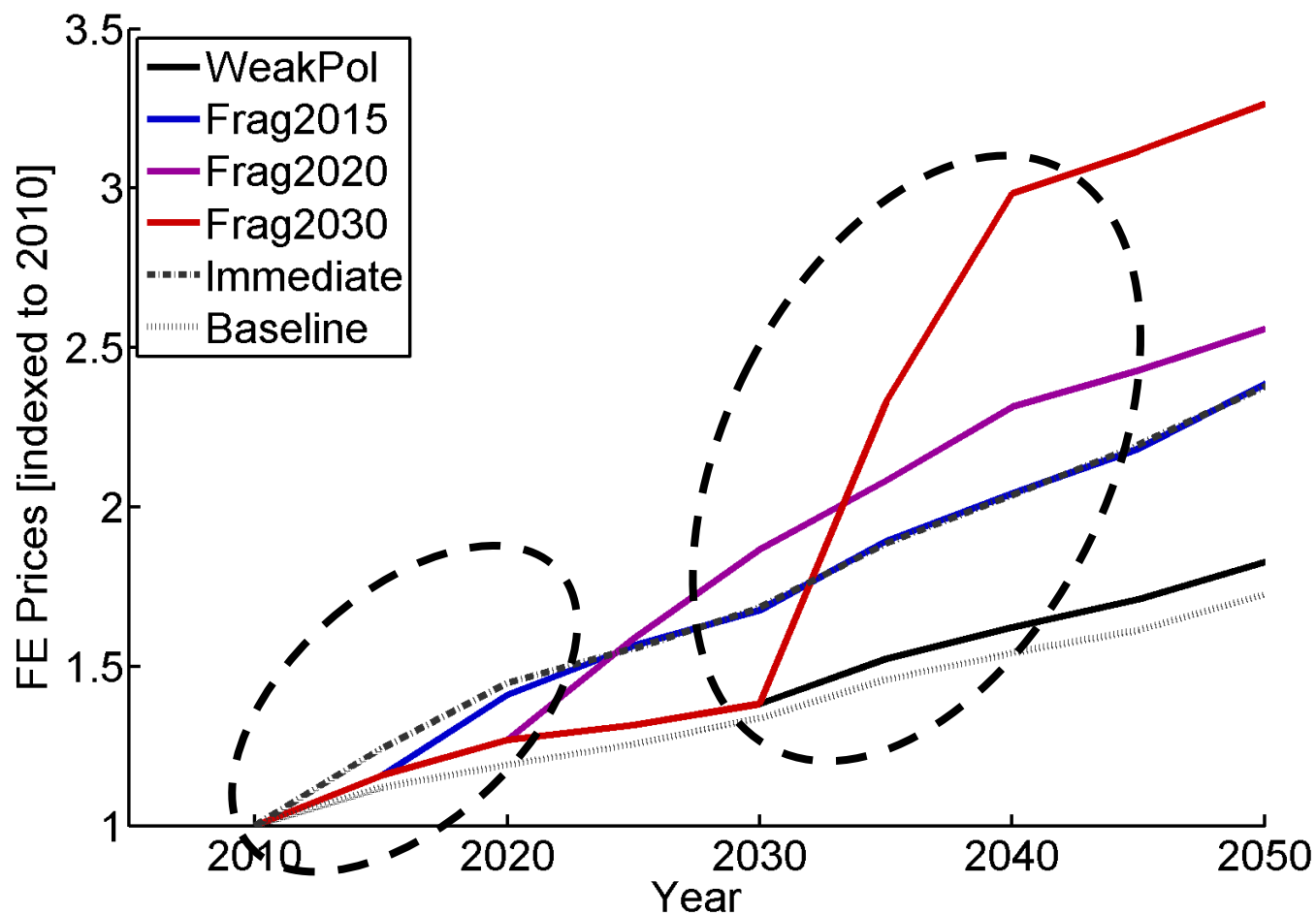
Carbon market value

Total value of emissions covered under carbon pricing scheme

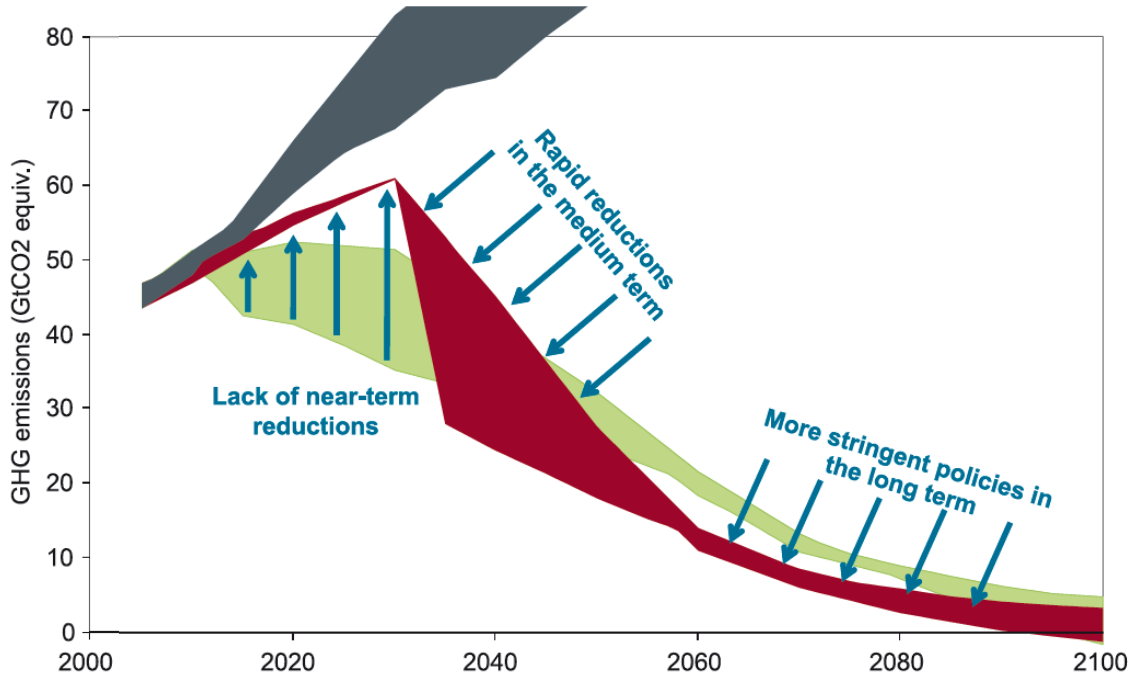


*discounted at 5%p.a.

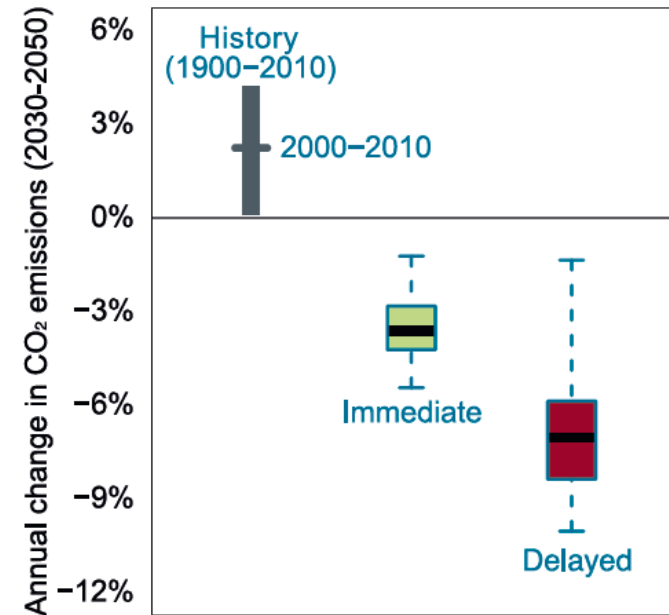
Increase of energy prices



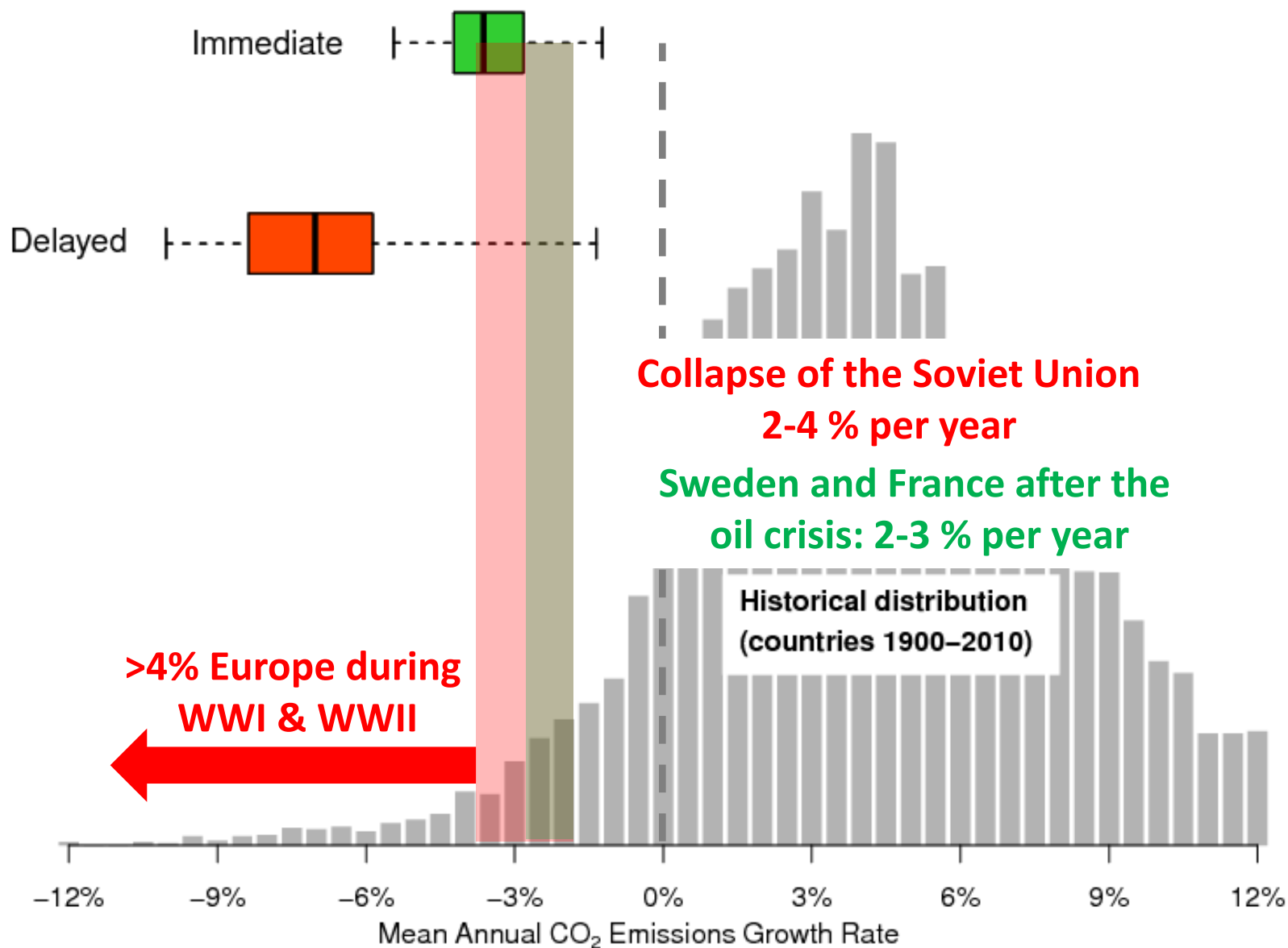
Higher pace of decarbonization required for 2°C limit



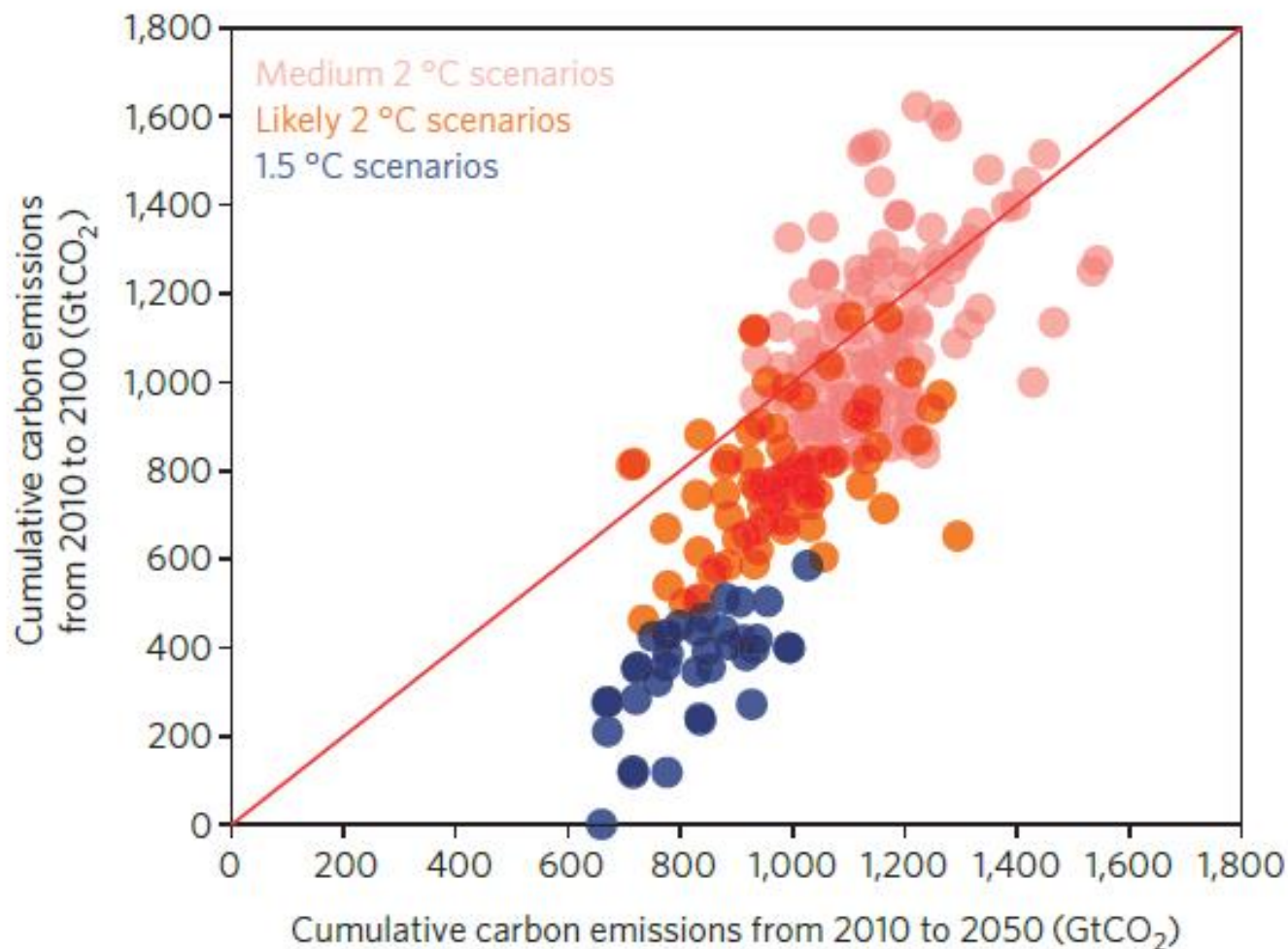
AMPERE study,
Riahi et al. (2015)



Pace of decarbonization



1.5°C vs. 2°C: Comparison of mitigation ambition



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